

THAT CLAIMED IS

1. A yarn texturizing system comprising:
 - a yarn supply having yarn positioned thereon;
 - a yarn stuffing container positioned downstream from the yarn supply to receive the yarn from the yarn supply so that the received yarn is stuffed within the yarn stuffing container and periodically released therefrom in a crimped position to thereby define textured yarn;
 - a yarn draw positioned downstream from the yarn supply to draw the yarn to the yarn-stuffing container at a selected speed;
 - a yarn conveyor belt positioned downstream from the yarn-stuffing container to receive the textured yarn thereon;
 - a yarn bundler positioned between the yarn stuffing container and the yarn conveyor belt to bundle the textured yarn prior to being received on the yarn belt so that the textured yarn passing through the yarn bundler defines bundled textured yarn;
 - a heat setting oven positioned downstream from the yarn bundler so that the yarn belt having the bundled textured yarn thereon passes through the heat setting oven to heat set the bundled textured yarn when passing therethrough; and
 - a yarn take-up positioned downstream from the heat setting oven to take-up the bundled textured yarn after being heat set.
2. A system as defined in Claim 1, wherein the yarn bundler includes a yarn bundling tube and a yarn bundling tube drive positioned to rotate the yarn bundling tube as the textured yarn received from the stuffing container passes therethrough.
3. A system as defined in Claim 2, wherein the yarn bundling tube has a yarn receiving end positioned adjacent the yarn stuffing container to receive the textured yarn from the yarn stuffing container therein and a yarn depositing end positioned at a lower elevation than the yarn receiving end and positioned adjacent the yarn conveyor belt so that the bundled textured yarn passing out of the yarn bundling tube is deposited onto the yarn conveyor belt, and wherein the yarn tube rotates about an imaginary tube axis extending through substantially an entire lengthwise extent of the yarn bundling tube.

4. A system as defined in Claim 3, wherein the yarn-receiving end of the yarn bundling tube has a larger inner circumference than the yarn-depositing end of the yarn bundling tube.

5. A system as defined in Claim 3, wherein the outer circumference of the yarn receiving end of the yarn bundling tube has one of the following shapes: circular, non-circular, rectangular, triangular, and hexagonal.

6. A system as defined in Claim 5, wherein the yarn bundling tube has at least one inner surface portion positioned therein so that the textured yarn received into the yarn bundling tube impinges on the at least one surface portion during rotation of the yarn bundling tube so that the at least one inner surface portion defines at least one impinging surface to thereby enable the textured yarn to be rotatably bundled as the textured yarn passes through the yarn bundling tube when rotating the yarn bundling tube with the yarn bundling tube drive.

7. A system as defined in Claim 5, wherein the at least one impinging surface comprises at least one of the following: a corner of an inner surface of the yarn bundling tube, a bend in an inner surface of the yarn bundling tube, a non-arcuate portion of an inner surface of the yarn bundling tube, a protrusion extending inwardly from an inner surface of the yarn bundling tube, a plurality of angled surfaces formed in an inner surface of the yarn bundling tube, and an arc region of an inner surface of the yarn bundling tube having a substantially different arc than other regions of the inner surface.

8. A system as defined in Claim 1, wherein the yarn draw continuously draws the yarn from the yarn supply at a selected speed, wherein the yarn stuffing container continuously periodically releases the textured yarn therefrom and into the yarn bundler, wherein the yarn belt continuously receives the bundled textured yarn thereon and continuously passes the bundled textured yarn through the heat setting over, wherein the yarn take-up continuously takes up the bundled textured yarn after heat set, and wherein the system further includes a bundled yarn compressor positioned downstream from the yarn bundler to compress accumulated mass of the bundled textured yarn on the yarn conveyor belt.

9. A system as defined in Claim 8, wherein the yarn belt has a selected width of an upper surface portion thereof extending along a selected length of the upper surface portion, wherein the textured yarn has a yarn mass, and wherein the yarn bundler substantially increases the yarn mass of the textured yarn per the selected length of the yarn belt when deposited thereon and when the selected speed of the yarn draw is substantially increased over a system not having the yarn bundler positioned between the yarn stuffing container and the yarn belt.

10. A yarn texturizing system comprising:

- a yarn supply having yarn positioned thereon;
- a yarn stuffing container positioned downstream from the yarn supply to receive the yarn from the yarn supply so that the received yarn is stuffed within the yarn stuffing container and periodically released therefrom in a crimped position to thereby define textured yarn;
- a yarn draw positioned downstream from the yarn supply to draw the yarn to the yarn-stuffing container at a selected speed;
- a yarn conveyor belt positioned downstream from the yarn stuffing container to receive the textured yarn thereon; and
- a yarn bundler positioned between the yarn stuffing container and the yarn conveyor belt to bundle the textured yarn prior to being received on the yarn belt so that the textured yarn passing through the yarn bundler defines bundled textured yarn.

11. A system as defined in Claim 10, further comprising a bulker positioned downstream from the yarn bundler and adjacent the yarn conveyor belt to bulk the bundled textured yarn, a heat setting oven positioned downstream from the yarn bundler so that the yarn belt having the bundled textured yarn thereon passes through the heat setting oven to heat set the bundled textured yarn when passing therethrough, a yarn cooler positioned downstream from the heat setting oven to cool the bundled textured yarn, and a yarn take-up positioned downstream from the yarn cooler and the heat setting oven to take-up the bundled textured yarn after being cooled.

12. A system as defined in Claim 10, wherein the yarn bundler includes a yarn bundling tube and a yarn bundling tube drive positioned to rotate the yarn bundling tube as the textured yarn received from the stuffing container passes therethrough.

13. A system as defined in Claim 12, wherein the yarn bundling tube has a yarn receiving end positioned adjacent the yarn stuffing container to receive the textured yarn from the yarn stuffing container therein and a yarn depositing end positioned at a lower elevation than the yarn receiving end and positioned adjacent the yarn conveyor belt so that the bundled textured yarn passing out of the yarn bundling tube is deposited onto the yarn conveyor belt, and wherein the yarn tube rotates about an imaginary tube axis extending through substantially an entire lengthwise extent of the yarn bundling tube.

14. A system as defined in Claim 13, wherein the yarn-receiving end of the yarn bundling tube has a larger inner circumference than the yarn-depositing end of the yarn bundling tube.

15. A system as defined in Claim 13, wherein the outer circumference of the yarn receiving end of the yarn bundling tube has one of the following shapes: circular, non-circular, rectangular, triangular, and hexagonal.

16. A system as defined in Claim 10, wherein the yarn bundler has at least one inner surface portion positioned therein so that the textured yarn received into the yarn bundler impinges on the at least one inner surface portion during rotation of the yarn bundler so that the at least one inner surface portion defines at least one impinging surface to thereby enable the textured yarn to be rotatably bundled as the textured yarn passes through the yarn bundler when rotating the yarn bundler.

17. A system as defined in Claim 16, wherein the at least one impinging surface comprises at least one of the following: a corner of an inner surface of the yarn bundler, a bend in an inner surface of the yarn bundler, a non-arcuate portion of an inner surface of the yarn bundler, a protrusion extending inwardly from an inner surface of the yarn bundler, a plurality of angled surfaces formed in an inner surface of the yarn bundler, and an arc region of an inner surface of the yarn bundler having a substantially different arc than other regions of the inner surface.

18. A system as defined in Claim 10, wherein the yarn draw continuously draws the yarn from the yarn supply at a selected speed, wherein the yarn stuffing container continuously

periodically releases the textured yarn therefrom and into the yarn bundler, wherein the yarn conveyor belt continuously receives the bundled textured yarn thereon and continuously passes the bundled textured yarn downstream, and wherein the system further includes a bundled yarn compressor positioned downstream from the yarn bundler to compress accumulated mass of the bundled textured yarn on the yarn conveyor belt.

19. A system as defined in Claim 10, wherein the yarn conveyor belt has a selected width of an upper surface portion thereof extending along a selected length of the upper surface portion, wherein the textured yarn has a yarn mass, and wherein the yarn bundler substantially increases the yarn mass of the textured yarn per the selected length of the yarn belt when deposited thereon and when the selected speed of the yarn draw is substantially increased over a system not having the yarn bundler positioned between the yarn stuffing container and the yarn conveyor belt.

20. An apparatus to bundle textured yarn, the apparatus comprising:
a yarn bundling tube having a preselected lengthwise extent and an imaginary tube axis extending through substantially the preselected lengthwise extent thereof; and
a yarn bundling tube drive positioned to rotate the yarn bundling tube about the imaginary tube axis so that when textured yarn enters the yarn bundling tube the rotating of the tube imparts a bundling of the textured yarn prior to the textured yarn exiting the yarn bundling tube and thereby define bundled textured yarn.

21. An apparatus as defined in Claim 20, wherein the yarn bundling tube has a yarn receiving end adapted to be positioned adjacent a yarn stuffing container to receive the textured yarn from the yarn stuffing container therein and a yarn depositing end adapted to be positioned at a lower elevation than the yarn receiving end and to be positioned adjacent a yarn conveyor belt so that the bundled textured yarn passing out of the yarn bundling tube is deposited onto the yarn conveyor belt.

22. An apparatus as defined in Claim 21, wherein the yarn-receiving end of the yarn bundling tube has a larger inner circumference than the yarn-depositing end of the yarn bundling tube.

23. An apparatus as defined in Claim 21, wherein the outer circumference of the yarn receiving end of the yarn bundling tube has one of the following shapes: circular, non-circular, rectangular, triangular, and hexagonal.

24. An apparatus as defined in Claim 20, wherein the yarn bundling tube has at least one inner surface portion positioned therein so that the textured yarn received into the yarn bundling tube impinges on the at least one surface portion during rotation of the yarn bundling tube so that the at least one inner surface portion defines at least one impinging surface to thereby enable the textured yarn to be rotatingly bundled as the textured yarn passes through the yarn bundling tube when rotating the yarn bundling tube with the yarn bundling tube drive.

25. An apparatus as defined in Claim 24, wherein the at least one impinging surface comprises at least one of the following: a corner of an inner surface of the yarn bundling tube, a bend in an inner surface of the yarn bundling tube, a non-arcuate portion of an inner surface of the yarn bundling tube, a protrusion extending inwardly from an inner surface of the yarn bundling tube, a plurality of angled surfaces formed in an inner surface of the yarn bundling tube, and an arc region of an inner surface of the yarn bundling tube having a substantially different arc than other regions of the inner surface.

26. An apparatus to bundle textured yarn, the apparatus comprising:
yarn bundling means for bundling textured yarn, the yarn bundling means having a preselected lengthwise extent and an imaginary axis extending through substantially the preselected lengthwise extent thereof; and
a yarn bundling drive positioned to rotate the yarn bundling means about the imaginary axis so that when textured yarn enters the yarn bundling means the rotating of the yarn bundling means imparts a bundling of the textured yarn prior to the textured yarn exiting the yarn bundling means and thereby define bundled textured yarn.

27. An apparatus as defined in Claim 26, wherein the yarn bundling means comprises a yarn bundling tube having a yarn receiving end adapted to be positioned adjacent a yarn stuffing container to receive the textured yarn from the yarn stuffing container therein and a yarn depositing end adapted to be positioned at a lower elevation than the yarn receiving end and to

be positioned adjacent a yarn conveyor belt so that the bundled textured yarn passing out of the yarn bundling tube is deposited onto the yarn conveyor belt.

28. An apparatus as defined in Claim 27, wherein the yarn-receiving end of the yarn bundling tube has a larger inner circumference than the yarn-depositing end of the yarn bundling tube.

29. An apparatus as defined in Claim 28, wherein the outer circumference of the yarn receiving end of the yarn bundling tube has one of the following shapes: circular, non-circular, rectangular, triangular, and hexagonal.

30. An apparatus as defined in Claim 26, wherein the yarn bundling means has at least one inner surface portion positioned therein so that the textured yarn received into the yarn bundling means impinges on the at least one inner surface portion during rotation of the yarn bundling means so that the at least one inner surface portion defines at least one impinging surface to thereby enable the textured yarn to be rotatably bundled as the textured yarn passes through the yarn bundling means when rotating the yarn bundling tube with the yarn bundling drive.

31. An apparatus as defined in Claim 30, wherein the at least one impinging surface comprises at least one of the following: a corner of an inner surface of the yarn bundling means, a bend in an inner surface of the yarn bundling means, a non-arcuate portion of an inner surface of the yarn bundling means, a protrusion extending inwardly from an inner surface of the yarn bundling means, a plurality of angled surfaces formed in an inner surface of the yarn bundling means, and an arc region of an inner surface of the yarn bundling means having a substantially different arc than other regions of the inner surface.

32. A method of producing textured yarn, the method comprising:
crimping yarn to define textured yarn;
bundling the textured yarn to define bundled textured yarn;
depositing the bundled textured yarn onto a conveyor; and
taking up the textured yarn after heating the bundled textured yarn.

33. A method as defined in Claim 32, further comprising compressing the bundled textured yarn prior to heating the bundled textured yarn.

34. A method of producing textured yarn, the method comprising:
rotating a yarn bundler about an imaginary axis extending through the yarn bundler;
receiving the textured yarn into the rotating yarn bundler; and
bundling the textured yarn prior to exiting the yarn bundler.

35. A method as defined in Claim 34, further comprising depositing the bundled textured yarn onto a moving conveyor, compressing the bundled textured yarn, and heating the bundled textured yarn after compressing.

36. A method of producing textured yarn, the method comprising:
providing a yarn texturizer;
increasing a speed of yarn travel being supplied to the yarn texturizer; and
increasing the amount of textured yarn mass deposited onto a preselected area of a moving conveyor belt having a preselected width and positioned adjacent the yarn texturizer when increasing the speed of yarn travel so that the amount of textured yarn mass is greater than the amount of textured yarn mass deposited in the preselected area at a slower speed of yarn travel.

37. A method as defined in Claim 36, further comprising compressing the increased amount of textured yarn mass as the increased amount of textured yarn mass travels on the moving conveyor belt.

38. A method of doing business, the method comprising:
charging a fee for the amount of money saved by a textured yarn manufacturer for reducing production loss in a continuous textured yarn production process, the fee being a percentage of the money saved by the textured yarn manufacturer.

39. A method as defined in Claim 38, the method including installing at least one yarn bundler into the continuous textured yarn production process at a facility of the textured yarn

manufacturer to thereby allow an increase in production speed of textured yarn on an existing textured yarn production line.

40. A method for increasing production speed in a textured yarn production process, the method comprising:

bundling textured yarn;

depositing the bundled texturized yarn onto a moving conveyor; and

compressing the bundled textured yarn when moving on the conveyor.